MICHIGAN DEPARTMENT OF NATURAL RESOURCES
WILDLIFE DIVISION BRIEFING PAPER

DEER AND ELK FEEDING ISSUES IN MICHIGAN

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ISSUES

An important function of the Department of Natural Resources (DNR) is to make recommendations to the Natural Resources Commission (NRC) concerning methods and manner of take of species under Commission authority. All recommendations are developed with consideration of the biological and social impacts of proposed changes and are based on the best available scientific information.

The supplemental feeding of deer, and in some localities elk, is a popular activity in many parts of the state. The DNR was asked to examine the issue of supplemental feeding of deer and elk and provide background information on the issue of feeding deer to the NRC and Michigan Department of Agriculture (MDA). The purpose of this paper is to review the biological and social implications of regulating or restricting the supplemental feeding of deer and elk. This paper will focus on artificial feeding, although results from studies done on baiting can also be applied. Whitcomb (1999) presents a thorough review of baiting issues in Michigan.

For purposes of regulation, supplemental feeding is defined as: The process of placing food, either natural or artificially produced, with the intent of supplementing the naturally occurring food available to deer or elk in their normal home range. Supplemental feeding does not include leaving unharvested agricultural crops or leaving of agricultural products in place after normally accepted harvest processing methods are used, cutting of native vegetation, or artificially fertilizing herbaceous or woody sites.

Baiting is defined as: The placement of food, either naturally or artificially produced, with the intent of attracting deer or elk during an open hunting season on either species. It is illegal to harvest elk over bait in Michigan.

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Supplemental feeding is undertaken for a variety of reasons: to minimize winter mortality, increase the number of deer in an area, or for wildlife viewing. Feeding is primarily practiced during the winter months, while baiting takes place primarily during an open hunting season on deer (Whitcomb 1999). However, in some areas of Michigan, private groups and individuals feed year-round.

The biological concerns regarding feeding of deer and elk include disease transmission, effects on movement, effects on habitat, and effectiveness in increasing survival. Social issues associated with feeding include public perception, wildlife viewing recreation, and economics. Controversies exist over whether deer numbers should be maintained at high levels by the use of supplemental feeding. These sustained high numbers can result in crop damage problems for area farm producers and habitat damage. Others challenge the ethics of maintaining a species population above the capacity of which the natural habitat can support using a process that relies on feeding during winter. In suburban areas and well-populated rural localities, feeding can concentrate deer and create problems for neighboring landowners who object when deer browse landscape vegetation. Large numbers of deer attracted to and maintained by feeding in such areas can also present safety hazards to local automobile traffic (Langenau 1996).

BACKGROUND AND DISCUSSION

BIOLOGICAL ISSUES

CATEGORIES OF ARTIFICIAL FEEDING

Artificial feeding has been characterized as either supplemental or emergency in nature (Mautz 1978, Voight 1990). Supplemental feeding is done to augment forage regardless of winter conditions (Voight 1990). This practice has increased over the last 20 years in the Great Lakes region (Lewis 1990, as cited in Doenier et al. 1997). Emergency feeding is defined as supplying feed to deer at times when their food supply is low or inaccessible (Voight 1990). In Michigan, this is primarily done in the Upper Peninsula during severe winters (Langenau 1996).

HISTORY OF FEEDING POLICY IN MICHIGAN

In the late 1950s, the Game Division adopted a policy opposing the use of artificial feed on a large-scale basis. This policy was aimed primarily at emergency winter feeding by the agency, but it also recognized that individuals would supplementally feed deer on private land. The policy did recognize that the Conservation Department would provide the best technical information to reduce the potential problems that might be caused by those private efforts.

In 1961, Public Law 87-152 was passed, which allowed government surplus grains to alleviate emergency conditions for resident wildlife. In response, the Conservation Department developed Game Policy Number 82, which established policies and procedures to allow for the feeding of surplus corn to deer for emergency purposes. This policy noted that the limitations of artificial feed as a regular tool of deer management are well known to the agency. The policy also recognized that in true emergency

situations, artificial feeding can save some deer for a subsequent harvest, but to be successful, the method of feeding was very important. Surplus corn was used as emergency food during four separate winters (1961-62, 1964-65, 1968-69, and 1970-71).

DISEASE

A major biological consideration of feeding deer is the increased potential for disease transmission whenever animals are concentrated (Leopold 1933). As part of the evaluation of the bovine tuberculosis (TB) eradication process in Michigan, research has been conducted to determine the effects of feeding and baiting on deer movement, migratory patterns, and behavior. The scientific community believes that the maintenance of bovine TB in Michigan white-tailed deer is directly related to supplemental feeding (Schmitt, et al. 1997). In response to the TB outbreak, the MDA prohibited supplemental feeding of deer and elk within the Bovine TB Management Area.

Another disease of deer that has been observed in free-ranging deer and elk in Colorado and Wyoming and captive deer and elk in South Dakota, Oklahoma, and Nebraska is chronic wasting disease. Evidence suggests infected deer and elk probably transmit the disease through animal-to-animal contact (Williams and Young 1980, Miller, Wild and Williams 1998). Chronic wasting disease seems more likely to occur in areas where deer or elk are crowded or where they congregate at man-made feed and water stations. Artificial feeding or baiting of deer and elk may compound the problem (Williams and Young 1980, Miller, Wild and Williams 1998). This disease has not been found in Michigan; however, due to its spread in the western U.S., it remains a potential problem (T. Cooley, DNR, Rose Lake Wildlife Lab., East Lansing, MI, pers. comm.).

There are several other diseases that affect white-tailed deer in varying degrees across North America. Many of these diseases are also transmittable to domestic cattle. These include anthrax, blackleg, brucellosis, hemmorhagic disease, vesicular stomatitis, leptospirosis, listeriosis, tularemia, anaplasmosis, and brainworm (Hurley 1995). Blackleg has been reported in Michigan in association with deer that had been injured during capture. Hemmorhagic disease outbreaks have occurred in Michigan, although the effects were not widespread (T. Cooley, DNR, Rose Lake Wildlife Lab., East Lansing, MI, pers. comm.). Brainworm is present in Michigan deer, but it is of no public health significance since it is not infective to humans (T. Cooley, DNR, Rose Lake Wildlife Lab., East Lansing, MI, pers. comm.). Brainworm has been shown to be lethal to other animals such as elk, moose, and woodland caribou (Anderson 1972, Kistner 1982). The spread of disease is related to deer density, stress, and increased number of animal-to-animal contacts (Davidson 1981).

Enterotoxemia, a disease resulting from overeating, affects winter stressed deer subjected to supplemental feeding. The use of high-energy, high-carbohydrate foods such as corn affect the microflora in the deer rumen. The overeating of these food sources increases the fermentation that occurs in the deer's rumen. This causes bloating, diarrhea, enteritis, and possibly death. This disease occurs almost yearly in Michigan, although it reported in relatively low numbers (T. Cooley, DNR, Rose Lake Wildlife Lab., East Lansing, MI, pers. comm.).

EFFECT ON MOVEMENT PATTERNS

Supplemental feeding may delay deer migration to winter habitats keeping deer in areas lacking natural food sources and lead to starvation when sources of supplemental feed are stopped (Ozoga and Verme 1982).

HABITAT

Feeding deer may also affect surrounding habitats. Doenier et al. (1997) reported that deer remain in close proximity (≤300 m) to supplemental feeding sites. Examples of habitat changes due to over-browsing on private club lands include changes in tree species composition, suppressed forest regeneration, and delayed development of stands (Michigan DNR 1993). Ozoga and Verme (1982) noted that after four seasons of concentrated foraging by deer, biomass of vegetation was reduced and some plant species composition was changed. Ullrey observed that a food supplement block caused deer to concentrate in the vicinity of the block and speculated that this may increase deer impacts on the natural vegetation in the area (D. Ullrey, MSU, Animal Science Dept., E. Lansing, MI, letter in DNR files, Jan. 26, 1993). Doenier et al. (1997) also reported that regardless of winter severity and the quantity of supplemental feed consumed, deer continued to browse. Schmitz (1990) also noted that even given an unlimited amount of supplemental food, free-ranging deer continued to browse. Throughout winter, Doenier et al. (1997) found that supplemental feeding had an increasing effect on browse pressures, compared to sites without feed.

Northern white cedar is sensitive to browsing, and long-term damage may result to stands due to deer browsing. Many of these stands are used as yard areas in the Upper Peninsula and Northern Lower Peninsula and are critical to the white-tailed deer in the north (Bartlett 1938). Supplemental feeding may positively affect reproduction rates (Ozoga and Verme 1982) and may raise population levels much higher than the natural habitat can support. This further exacerbates the over-browsing problem in the area. It also makes it impossible to maintain deer populations within limits of the habitat carrying capacity, which is probably the single, most effective means of reducing density dependent problems including infectious diseases (Davidson 1981).

EFFECTIVENESS OF EMERGENCY FEEDING

Emergency feeding can benefit a deer herd in two primary ways. First, feeding can reduce winter mortality of winter-stressed deer (Baker and Hobbs 1985). Deer must survive on fat reserves that they have accumulated during the previous summer and fall (Mautz 1978), and artificial feeding would slow the depletion of these reserves. Second, feeding can increase the survival of fawns born the following spring. Verme (1977) reported that fetal growth is reduced in winter-stressed, pregnant does and suggested that subsequent survival of these undersized fawns would be reduced. However, both benefits are aimed at holding deer populations around the actual carrying capacity. In practice, however, large-scale emergency feeding efforts have not shown positive benefits mentioned above (Bartlett 1938, Gerstell 1942, Carhart 1943, Hesselton 1964, Langenau 1996).

Feeding deer to prevent catastrophic winterkill has been tried in many states. Michigan used surplus corn during four separate winters (1961-62, 1964-65, 1968-69, and 1970-71) to help deer survive on over-browsed deer range (Langenau 1996). In these instances, feeding was found to be ineffective. The cost of large-scale, emergency feeding projects do not warrant the return of increased deer survival. However, such programs are very expensive. It cost $82.69 per deer to supplementally feed deer throughout the year and about $36.75 per deer through winter (Langenau 1996). The ineffectiveness of reaching significant portions of the winter deer population is a major factor in reducing the effectiveness of emergency feeding (Minnesota DNR 1991).

SOCIAL ISSUES

PUBLIC PERCEPTION OF EMERGENCY FEEDING

Past attempts at emergency feeding by the Michigan DNR sent the wrong message to the public and reinforced erroneous ideas about deer management. People thought that deer could be stockpiled beyond the carrying capacity of the range. Government feeding did not increase public willingness to harvest antlerless deer through regulated hunting. Despite extensive feeding of deer in the Upper Peninsula in 1970-71, the public asked for a moratorium on antlerless deer hunting in 1971 (Langenau 1996).

Large-scale emergency feeding is very expensive and detracts from a Department's ability to do other deer management work. In sites such as Minnesota, the cost of distributing 105,000 bushels of corn in 1971 was about $100,000, which was almost equal to the Minnesota Wildlife Division's budget for deer habitat management that year. Efforts to feed deer reduced the time available for other management programs (Minnesota DNR 1991).

FEEDING AS A WILDLIFE RECREATION ACTIVITY

Feeding deer (and other wildlife) is a popular and highly valued pastime in Michigan. Many people enjoy wildlife viewing at feed sites. The animals often become habituated to the presence of humans and allow for close approaches. There is little documentation on exactly how many Michigan residents feed deer and elk, but it is perceived to be significant (Nelson and Schomaker 1996, Garner 1998). Among private landowners that responded to a 1996 survey (Nelson and Schomaker 1996), 78.3 percent of those that reported deer crop damage participated in deer viewing on their property. Further, these same respondents reported that either they or others: grew crops for deer (19.2 percent), placed feed for deer outside of deer season (16.8 percent), and/or placed bait for deer during hunting season (19.2 percent).

ECONOMICS

Another social issue that should be considered is the economic effect of a ban or restriction on feeding. Most surveys have focused on the economic value of baiting and have not examined feeding as a separate activity. Winterstein's (1992) survey estimated that bait was valued in excess of 50 million

dollars. It is assumed that the economic value of feeding would be in addition to the value of baiting. Garner (1998) identified a number of stakeholders that benefit from sales of deer food, including farmers, transporters, and merchants. Kenneth Nye at Michigan Farm Bureau (MFB) reported that feeding and baiting generated a minimum value to farmers of about 15 million dollars and 2-3 times that amount to retailers in 1995. He noted some farmers started new businesses to take advantage of these new markets. These new businesses were primarily in the northern part of the state in areas that previously did not support them. Carrot growers probably benefited the greatest from the increased interest in feeding and baiting because there was not previously a market for culled carrots. This resource is worth 2-3 million dollars annually in Michigan (K. Nye, MFB, Lansing, MI, pers. comm.) In 1995, MFB suggested support for regulating baiting if it could be done early enough to allow farm producers to adjust their seed orders or locate additional markets for the deer bait. In 1998, MFB passed a resolution supporting a statewide bait limit of five gallons, and it approved of legislation to prohibit deer feeding statewide. The economic effects of contracting disease in both wild and domestic cervids are shown throughout history. In Michigan, the economic costs to the agricultural industry to contain the spread of TB transmitted between free-ranging deer and domestic livestock are estimated at 16 million dollars annually. The cost to eradicate TB in free-ranging deer in northeast Michigan will also be significant.

CONCLUSIONS

The question of supplemental feeding creates conflict between a policy to manage a state resource to provide ecological benefits and a variety of social needs and the policy to provide wildlife-related recreational opportunities. To feed deer as a means of expanding population numbers beyond normal carrying capacity to maximize deer harvest or wildlife viewing opportunities diminishes and compromises other management goals. This is true whether feeding is done by citizens or by state agencies. In addition to this fundamental conflict, supplemental feeding can create a host of specific problems.

Research data suggest that supplemental feeding of deer has the potential to increase disease transmission through close animal contacts with food, feces, urine, and other animals at the feed pile. This is especially true when feeding during winter concentrates animals for a prolonged period of time. Concentration leads to close animal-to-animal contact and stress that may facilitate transmission of diseases such as bovine TB. While TB is the main focus of disease at this time in Michigan, there is a potential for other diseases to be involved elsewhere in the state. Supplemental feeding creates appropriate conditions for pathogenic forms, and extensive feeding could contribute to this problem.

The effects of feeding on factors such as deer movements, habitat damage, and deer behavior have been widely studied. Practical experience has shown that the cost of large-scale deer feeding programs far exceeds the value or advantages that might be gained. Supplemental feeding of deer may cause serious range deterioration in the areas where deer are fed, causing a drastic decline in the “natural” carrying capacity of the range. The deer fed successfully one winter will be present to reproduce and compound the food-shortage problem the next year. If feeding is carried out year after year, without an adequate deer harvest, the cost and effort to maintain a feeding program large enough to handle the extra deer will “snowball.”

There are strong economic interests in the issue of feeding and baiting with its net value estimated at over 50 million dollars annually in 1991. In Michigan, the economic costs to the agricultural industry to contain the spread of TB transmitted between free-ranging deer and domestic livestock are estimated at 16 million dollars annually. The cost to eradicate TB in free-ranging deer in northeast Michigan will also be significant.

Based upon the review of this issue, the Wildlife Division supports the effort to eliminate the supplemental feeding of deer and elk in Michigan through the placement of agricultural products.

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